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(56) Documents Cited

GB 1395774 A

GB 1119807 A

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GB 0930865 A

GB 0776821 A

GB 0626223 A

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(54) Gas thermostat

(57) In a gas thermostat with a valve (9) and an expansion heat-sensitive element (30) controlling the valve (9) through a lever (39), an eccentric adjustment arrangement is provided (43, 44) which, by shifting the fulcrum of the lever (39), allows the thermostat to be set.

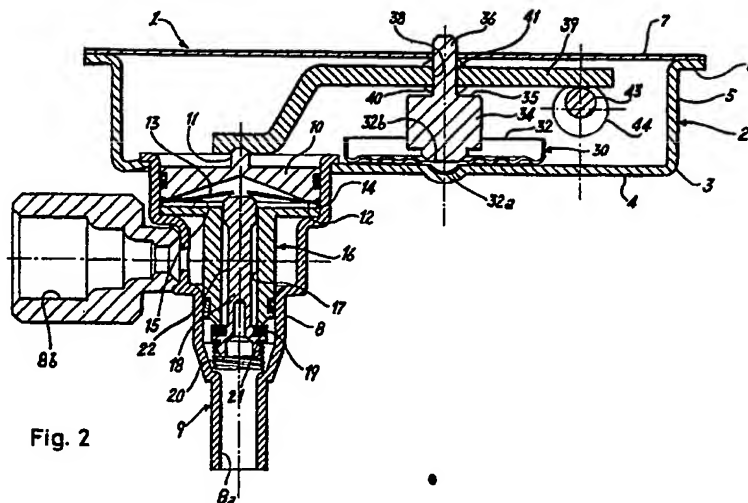
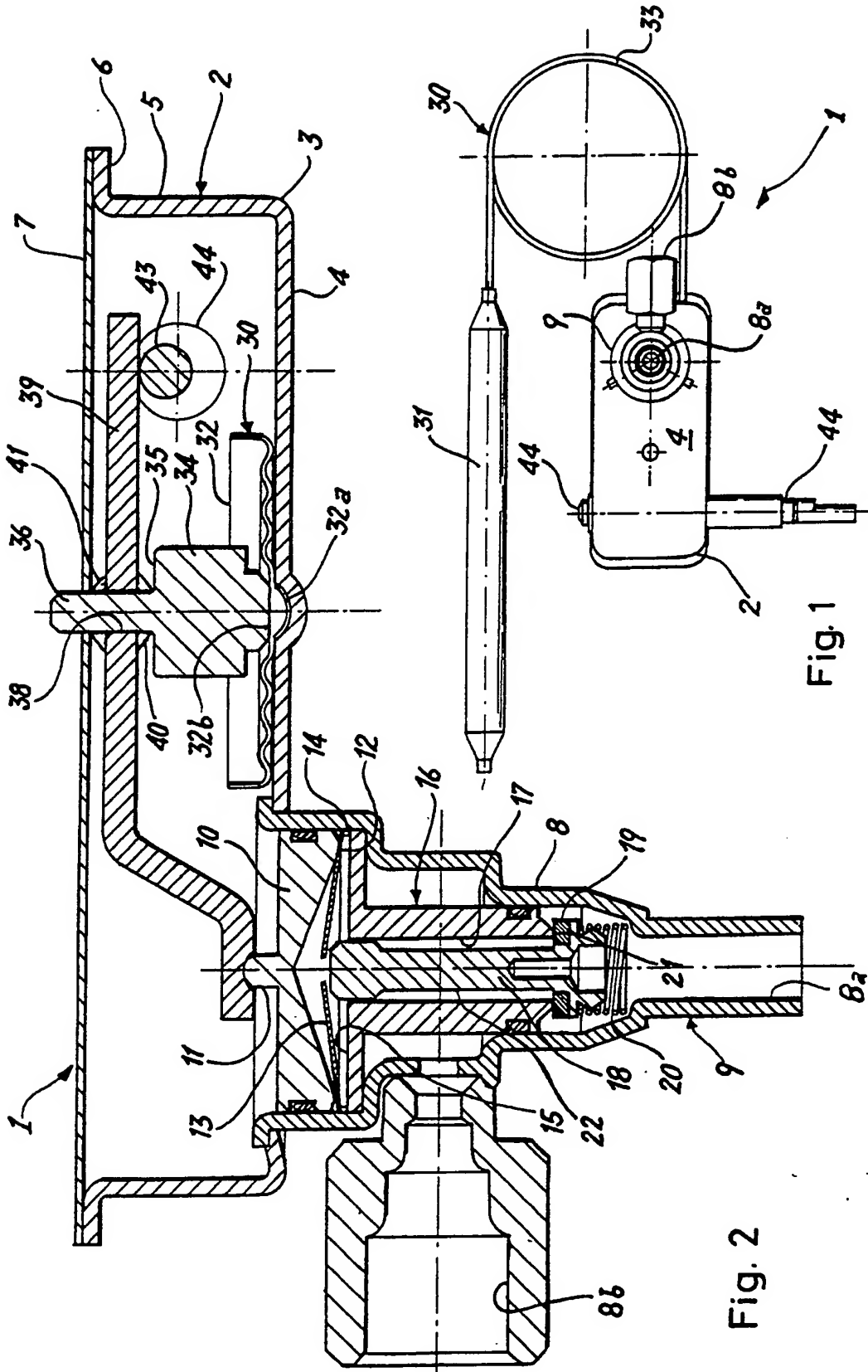


Fig. 2

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GAS THERMOSTAT

This invention relates to a gas thermostat of the type which comprises a valve and a heat-sensitive element which controls said valve through a lever, said heat-sensitive element acting on a portion of said lever intermediate to said valve and a lever fulcrum.

Thermostats with the above features have been known from this Applicant's line. Such thermostats, while performing satisfactorily, still have some drawbacks in connection with their adjustability and ease of assembly.

The underlying problem of this invention is to provide a thermostat as outlined above, which is conceived, both construction- and function-wise, to overcome the drawbacks with which the mentioned prior art is beset.

This problem is solved. in accordance with the invention, by a thermostat as indicated being characterized in that said lever fulcrum is shiftable in a controlled manner relative to said lever for setting said thermostat.

The features and advantages of the invention will be apparent from the following detailed description of a preferred embodiment thereof, given by way of example and not of limitation with reference to

the accompanying drawings, in which.

Figure 1 is a bottom plan view of a thermostat embodying this invention; and

Figure 2 is an enlarged sectional view taken along line II-II in Figure 1.

In the drawing figures, a gas thermostat is generally shown at 1 which comprises a case 2 having a body 3 dished to an essentially rectangular tray-like shape in plan view. The body 3 is formed with a bottom 4 and peripheral walls 5 whose free end is bent outwards into a lip 6. The case 2 also comprises a cover 7 which closes the body 3 at the top and is formed from an elastically deformable foil also performing a spring function, in a manner to be explained; the cover is welded on the body 3 along the lips 6.

A hole is provided in the bottom 4 of the case 2 to receive and hold the body 8 of a snap valve, generally shown at 9, therein. This valve is conventional in construction and is operative to respectively cut off or communicate two conduits 8a,b in the body 8 from/to each other. It is controlled through an actuator 10 which has a lug 11 on one axial end thereof, and on the axially opposite end, a cuspidate annulus 12 whose tip is to act on a

disk-shaped spring 13. The outer edge of said spring bears on a ring 14 which holds the spring 13 raised off the flange surface 15 of a flanged element 16. This element 16 is provided centrally with a hole 17 in which a shutter 18 is fitted slidably. The shutter 18 carries a sealing gasket 19 wherethrough it is biased by a spring 20 to close a seat 21 formed in the opposite axial end of the element 16 from the surface 15. Said shutter 18 has a stem 22 received in the hole 17 and from which it stands proud of the surface 15 at a central area of the spring 13. Consequently, upon the actuator 10 being pushed in the direction toward the shutter 18, the spring 13 is deformed elastically until, on a threshold value being exceeded, the spring snaps from the position of Figure 2, where its tip is facing toward the actuator 10, to a reverse position where its tip is facing toward the shutter 18, thereby interfering with the shutter stem 22. Thus, the shutter is operated to uncover the seat 21.

An expansion type of heat-sensitive element, generally indicated at 30 and also of conventional construction, is arranged to operate the actuator 10.

The element 30 comprises a probe 31 and an expansion capsule 32, interconnected by a capillary tube 33. The capsule 32 is conventionally formed with

two walls 32a,b the mutual spacing whereof is varied according to the extent of the expansion undergone by a liquid or a vapor in relation to the temperature detected by the probe 31. Attached centrally to the wall 32b is a foot 34 having a shoulder 35 whereon a tang section 36 stands upright. The section 36 through-penetrates a hole 38 provided in a lever 39, while the shoulder 35 functions as an abutment surface for one of two oppositely located lugs 40, 41 which protrude from opposed sides of the lever 39.

The lug 41 bears against the wall of the cover 7, which cover functions here as a spring acting on the lever 39 to resist the action from the expansion of the capsule 32.

Notice that the lever 39 is a lever of the third order formed at one end with a spherical seat 39a for contact by the rounded end of the lug 11 of the valve actuator 10, and having the opposite end 39b in abutment contact with an eccentric cylindrical portion 43 of a shaft 44 which is journalled in the case 2. The portion 43 of the shaft 44 constitutes, therefore, a fulcrum for the lever 39, and the position of this fulcrum relative to the lever can be adjusted by rotating the shaft 44.

The thermostat of this invention operates as

follows.

Upon a drop in temperature being detected by the probe 31, the capsule 32 contracts and the distance separating its walls 32a,b decreases. This movement is transferred in amplified form to the actuator 10 of the valve 9 by the lever 39. As a result of the lever movement, the actuator will control the valve spring 13 to open the shutter 18. The reverse operation would take place when the probe 31 detects a temperature increase above a predetermined thermostat tripping temperature. This tripping temperature is adjusted by rotation of the shaft 44 to change the fulcrum position of the lever 39.

An embodiment of the invention has been described which employs a snap valve 9. However, it would also be possible for the valve 9 to be a modulating type. In this event, parts 13 and 14 would be omitted, and part 10 would be redesigned to act directly on the shutter 18.

With the arrangements described above, a thermostat can be provided which has a simple and economical construction, is reliable in operation, and affords enhanced ease of adjustment.

CLAIMS

1. A gas thermostat comprising a valve (9) and a heat-sensitive element (30) which controls said valve (9) through a lever (39), said heat-sensitive element (30) acting on a portion of said lever (39) intermediate to said valve (9) and a lever fulcrum (43), characterized in that said lever fulcrum (43) is shiftable in a controlled manner relative to said lever (39) for setting said thermostat.

2. A thermostat according to Claim 1, wherein an eccentric type of adjustment arrangement (43,44) acting on said lever (39) is provided for shifting said fulcrum.

3. A thermostat according to Claim 2, wherein said adjustment arrangement comprises a shaft (44) journaled in a thermostat case (2) and carrying a portion (43) eccentrically thereon for contact with said lever (39) and adapted to provide said fulcrum.

4. A thermostat according to either Claim 1, 2 or 3, wherein said valve (9) is a snap type.

5. A thermostat according to one or more of the preceding claims, wherein said lever (39) is a lever of the third order arranged to transfer, in an amplified manner to an actuator (10) for said valve (9), a signal to shift from said heat-sensitive element

(30).

6. A thermostat according to one or more of the preceding claims, wherein a leaf spring (7) is arranged to act on the lever (39) against the action of said heat-sensitive element (30).

7. A thermostat according to Claim 6, comprising a case (2) which encloses said lever (39) and said heat-sensitive element (30), and wherein said spring (7) forms a wall of said case (2).

8. A thermostat according to Claim 7, wherein said case comprises an element (3) dished to a tray-like shape, and a cover, said spring (7) being part of said cover.

9. A gas thermostat substantially as hereinbefore described with reference to the accompanying drawings.

Relevant Technical Fields

(i) UK Cl (Ed.M) F2V (VS19, VS25, VS30, VS40, VS43); F4T (THE1, THG)

(ii) Int Cl (Ed.5) F16K; F23N: GO5D

Databases (see below)

(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

(ii) ONLINE DATABASES: WPI

Search Examiner
ALEX LITTLEJOHN

Date of completion of Search
22 SEPTEMBER 1994

Documents considered relevant following a search in respect of Claims :-
1-9

Categories of documents

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| X: Document indicating lack of novelty or of inventive step. | P: Document published on or after the declared priority date but before the filing date of the present application. |
| Y: Document indicating lack of inventive step if combined with one or more other documents of the same category. | E: Patent document published on or after, but with priority date earlier than, the filing date of the present application. |
| A: Document indicating technological background and/or state of the art. | &: Member of the same patent family; corresponding document. |

Category	Identity of document and relevant passages		Relevant to claim(s)
X	GB 1395774	(CONCENTRIC) see whole documents, eg page 3 lines 72-124	1, 2, 3, 5, 6
X	GB 1119807	(ROBERTSHAW) see whole document eg page 3 lines 1-23	1-5
X	GB 935248	(HARPER-WYMAN) see whole document eg page 3 lines 35-55	1, 2, 3, 5
X	GB 930865	(ROBERTSHAW) see whole document eg page 3 lines 26-49	1, 2, 3, 5
X	GB 776821	(ROBERTSHAW) see whole document eg page 3 lines 14-31 and 67-77	1, 2, 3, 5
X	GB 626223	(BAILEY) see whole document eg page 4 lines 2-36	1, 2, 3, 5

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).